What is claimed is:

1. A method of repairing a Phase Shift Mask (PSM), while maintaining desired transmission rate and phase angle of the PSM, comprising the steps of:

providing a Phase Shift Mask (PSM) having a first and a second surface, said PSM having been provided with a pattern of phase shifter material over the second surface of said PSM, said pattern of phase shifter material comprising at least one faulty element;

depositing a layer of photoresist over the second surface of said Phase Shift Mask, including the surface of said pattern of phase shifter material provided over the second surface of said PSM;

exposing the first surface of said PSM, thereby exposing said deposited layer of photoresist except where said layer of photoresist is shielded by said pattern of phase shifter material provided over the second surface of said PSM;

developing said exposed layer of photoresist, removing said layer of photoresist from in between said pattern of phase shifter material over the second surface of said PSM, leaving said layer of photoresist in place overlying said pattern of phase shifter material including said at least one faulty element;

repairing said at least one faulty element present in said pattern of phase shifter material;

removing Ga stain from the second surface of said PSM; and

removing said developed layer of photoresist from the surface of said pattern of phase shifter material.

2. The method of claim 1, wherein said patterned layer of phase shifter material has a thickness of about 1,000 Angstrom.

3. The method of claim 1, wherein said layer of photoresist is deposited to a thickness within the range of about 3,000 and 7,000 Angstrom.

4. The method of claim 1, wherein said exposing the first surface of said PSM comprises UV exposure with a wavelength of 193 or 248 μm. and a radiation energy within the range of about 400 to 700 mJoule.

5. The method of claim 1, wherein said repairing said at least one faulty element present in said pattern of phase shifter material comprises Focused Ion Beam technology.

6. The method of claim 1, wherein said removing Ga stain from the second surface of said PSM comprises applying an oxygen plasma etch to the second surface of said PSM.

7. The method of claim 6, wherein said plasma etch comprises heating said surface of said PSM in a highly oxidized environment under a temperature and a pressure with a plasma flow being provided.

8. The method of claim 7, said temperature being in the range of about 350 to 450 degrees C.

9. The method of claim 7, said pressure being in the range between about 400 and 500 Torr

10. The method of claim 7, said plasma flow being a O_3 plasma flow within the range of about 4,000 to 6,000 sccm/min.

11. The method of claim 1, with an additional step of baking the deposited layer of photoresist, said additional step being performed after said step of depositing a layer of photoresist over the second surface of said Phase Shift Mask.

12. The method of claim 11, wherein said step of baking the deposited layer of photoresist comprises applying a temperature in the range between 300 and 700 degrees C., under atmospheric pressure, for a time between about 10 and 30 seconds.

13. The method of claim 1, said Phase Shift Mask (PSM) comprising a quartz substrate.

14. A method of repairing a Phase Shift Mask (PSM), while maintaining desired transmission rate and phase angle of the PSM, comprising the steps of:

providing a Phase Shift Mask (PSM) having a first and a second surface, said PSM having been provided with a pattern of phase shifter material over the second surface of said PSM, said pattern of phase shifter material comprising at least one faulty element;

creating a layer of protective semiconductor material over the surface of said pattern of phase shifter material provided over the second surface of said PSM, including the surface of said at least one faulty element in said pattern of phase shifter material;

repairing said at least one faulty element in said pattern of phase shifter material;

removing a Ga stain from the second surface of said PSM; and

removing said layer of protective layer of semiconductor material from the surface of said pattern of phase shifter material provided over the second surface of said PSM.

15. The method of claim 14, said layer of protective semiconductor material comprising photoresist.

16. The method of claim 14, said creating a layer of protective semiconductor material over the surface of said pattern of phase shifter material provided over the second surface of said PSM including the surface of said at least one faulty element in said pattern of phase shifter material comprising the steps of:

depositing a layer of protective semiconductor material over the second surface of said Phase Shift Mask, including the surface of said pattern of phase shifter material provided over the second surface of said PSM;

exposing the first surface of said PSM, thereby exposing said deposited layer of protective semiconductor material except where said layer of protective semiconductor material is shielded by said pattern of phase shifter material provided over the second surface of said PSM; and

developing said exposed layer of protective semiconductor material, removing said layer of protective semiconductor material from in between said pattern of phase shifter material

over the second surface of said PSM, leaving said layer of protective semiconductor material in place overlying said pattern of phase shifter material including said at least one faulty element.

17. The method of claim 14, wherein said pattern of phase shifter material over the second surface of said PSM has thickness of about 1,000 Angstrom.

18. The method of claim 14, wherein said layer of protective semiconductor material is deposited to a thickness within the range of about 3,000 and 7,000 Angstrom.

19. The method of claim 14, wherein said exposing the first surface of said PSM comprises UV exposure with a wavelength of 193 or 248 μm. and a radiation energy within the range of about 400 to 700 mJoule.

20. The method of claim 14, wherein said repairing said at least one faulty element present in said pattern of phase shifter material comprises Focused Ion Beam technology.

21. The method of claim 14, wherein said removing Ga stain from the second surface of said PSM comprises applying an oxygen plasma etch to the second surface of said PSM.

22. The method of claim 21, wherein said plasma etch comprises heating said surface of said PSM in a highly oxidized environment under a temperature and a pressure with a plasma flow being provided.

23. The method of claim 22, said temperature being in the range of about 350 to 450 degrees C.

24. The method of claim 22, said pressure being in the range between about 400 and 500 Torr

25. The method of claim 22, said plasma flow being a O_3 plasma flow within the range of about 4,000 to 6,000 sccm/min.

26. The method of claim 14, with an additional step of baking the deposited layer of protective semiconductor material, said additional step being performed after said step of creating a layer of protective semiconductor material over the surface of said pattern of phase shifter material provided over the second surface of said PSM.

27. The method of claim 26, wherein said step of baking the deposited layer of protective semiconductor material comprises applying a temperature in the range between 300 and 700 degrees C., under atmospheric pressure, for a time between about 10 and 30 seconds.

28. The method of claim 14, said Phase Shift Mask (PSM) comprising a quartz substrate.